

What Is Claimed Is:

1. A mixer comprising:

first and second transistors which constitute a balanced  
5 oscillation circuit with their respective emitters connected  
with each other;

a third transistor whose emitter is connected with the  
emitter of the first transistor; and

a fourth transistor whose emitter is connected with the  
10 emitter of the second transistor, wherein

a first signal is inputted between a base of the third  
transistor and a base of the fourth transistor in a balanced way;

wherein the third transistor and the fourth transistor  
mix an oscillation signal with the first signal; and

15 wherein a second signal is outputted from the third  
transistor and the fourth transistor in a balanced way.

2. The mixer according to Claim 1, wherein

there are a first parallel resonant circuit which  
determines an oscillation frequency and a second parallel  
20 resonant circuit which resonates with the second signal;

wherein the first parallel resonant circuit is connected  
between an collector and the base of each of the first and second  
transistors; and

wherein the second parallel resonant circuit is connected  
25 between a collector of the third transistor and a collector of  
the fourth transistor.

3. The mixer according to Claim 1, wherein

the first parallel resonant circuit is made up of a first capacitor, and first and second inductors which are serially connected with each other and connected in parallel with the first capacitor;

5            wherein a point of connection between the first capacitor and the first inductor is connected with the collector of the first transistor;

             wherein a point of connection between the first capacitor and the second inductor is connected with the collector of the  
10 second transistor;

             wherein the second parallel resonant circuit is made up of a second capacitor, and third and fourth inductors which are serially connected with each other and connected in parallel with the second capacitor;

15           wherein a point of connection between the second capacitor and the third inductor is connected with the collector of the third transistor;

             wherein a point of connection between the second capacitor and the fourth inductor is connected with the collector  
20 of the fourth transistor; and

             wherein supply voltage is fed to a point of connection between the first inductor and the second inductor and a point of connection between the third inductor and the fourth inductor.

4. The mixer according to Claim 1, wherein

25           there is a composite resonant circuit which has parallel resonance frequencies in the respective vicinities of an oscillation frequency and the second signal;

wherein the collector of the first transistor and the collector of the third transistor are connected with each other;

wherein the collector of the second transistor and the collector of the fourth transistor are connected with each other;

5 and

wherein the composite resonant circuit is connected between the collectors of the first and third transistors and the base of the second transistor as well as between the collectors of the second and fourth transistors and the base of  
10 the first transistor.

5. The mixer according to Claim 4, wherein the composite resonant circuit comprises:

a first capacitor;

a serial circuit which is made up of a second capacitor  
15 and first and second inductors and is connected in parallel with the first capacitor with the second capacitor located between the first and second inductors; and

third and fourth inductors which are serially connected with each other and connected in parallel with the second  
20 capacitor;

wherein the first and second capacitors and the first and second inductors generate parallel resonance in the vicinity of the oscillation frequency;

wherein the second capacitor and the third and fourth  
25 inductors generate parallel resonance in the vicinity of the second signal frequency;

wherein the point of connection between the first

capacitor and the first inductor is connected with the collectors of the first and third transistors;

wherein the point of connection between the first capacitor and the second inductor is connected with the  
5 collectors of the second and fourth transistors; and

wherein supply voltage is fed to the point of connection between the third and fourth inductors.

6. The mixer according to Claim 5, wherein the second signal is outputted from both ends of the second capacitor.

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